The Claims

What is claimed is:

1. A repeater for exchanging information between digital computing devices respectively connected to a shared or to a sharing distributed arbitration digital data bus, said repeater interconnecting said shared and said sharing data buses into a single composite digital data bus to which composite bus said digital computing devices connect in parallel, said repeater comprising:

shared bus interface means, connected to the shared distributed arbitration bus, for receiving signals from and transmitting signals to devices connected to the shared distributed arbitration bus;

sharing bus interface means, connected to the sharing distributed arbitration bus, for receiving signals from and transmitting signals to devices connected to the sharing distributed arbitration bus; and

control circuit means, simultaneously connected both to said shared bus interface means and to said sharing bus interface means, said control circuit means responding to a plurality of signals on said buses for controlling the exchange of information between devices connected to said composite bus.

2. The repeater of claim 1 wherein information is exchanged between devices connected to said composite digital data bus in accordance with a protocol having a plurality of phases, said control circuit means controlling the exchange of information between said devices being also responsive to the occurrence of a sequence of phases of said bus protocol.

3. The repeater of claim 2 wherein devices connected to one of the distributed arbitration buses exchange information with other devices connected to that distributed arbitration bus employing one convention for signals thereon, and devices connected to the other distributed arbitration bus exchange information with other devices connected to that

other distributed arbitration bus employing a different convention for signals thereon, the convention by which signals are transmitted on one distributed arbitration bus being incompatible with the convention by which signals are exchanged on the other distributed arbitration bus.

4. The repeater of claim 2 wherein each of said interface means are respectively adapted for exchanging signals with devices in accordance with a particular signaling convention, said interface means providing an indication if a device employing a different signaling convention, incompatible with the signaling convention to which said interface means is adapted, is connected to said bus connected to said interface means.

5. A bus switch for exchanging information between digital computing devices respectively connected to a shared or to one of a plurality of sharing distributed arbitration digital data buses, said bus switch interconnecting said shared and a selected one of said sharing data buses into a single composite digital data bus to which composite bus said digital computing devices connect in parallel, said information being exchanged between devices connected to said composite digital data bus in accordance with a protocol having a plurality of phases, said bus switch comprising:

shared bus interface means, connected to the shared distributed arbitration bus, for receiving signals from and transmitting signals to devices connected to the shared distributed arbitration bus;

a plurality of sharing bus interface means, each of said sharing bus interface means being respectively connected to one of said sharing distributed arbitration buses, for receiving signals from and transmitting signals to devices connected to the sharing distributed arbitration bus to which said sharing bus interface means connects;

selection switch means for choosing which one of said sharing bus interface means is enabled for exchanging

information between devices respectively connected to the shared bus and the enabled sharing bus; and

control circuit means, simultaneously connected both to said shared bus interface means and to said sharing bus interface means, said control circuit means responding to a plurality of signals on said buses and to the occurrence of a sequence of phases of said bus protocol for controlling the exchange of information between devices connected to said composite bus.

6. The bus switch of claim 5 wherein said selection switch means comprises a plurality of selection switches, each such selection switch being associated with one of said sharing bus interface means and with the sharing distributed arbitration bus connected thereto, activation of each such selection switch generating a selection signal that requests exchanging information between devices respectively connected to said shared distributed arbitration bus and the sharing distributed arbitration bus with which said selection switch is associated.

7. The bus switch of claim 6 wherein each of said selection switches is electrically connected directly to said sharing bus interface means with which said selection switch is associated.

8. The bus switch of claim 6 wherein each of said selection switches is electrically connected directly to said sharing bus interface means with which said selection switch is associated by a bus which is separate from the sharing distributed arbitration bus with which said selection switch is associated.

9. The bus switch of claim 5 wherein devices connected to a particular one of the sharing distributed arbitration buses exchange information with other devices connected to that sharing distributed arbitration bus employing one convention for signals thereon, and devices connected to the

shared distributed arbitration bus exchange information with other devices connected to that shared distributed arbitration bus employing a different convention for signals thereon, the convention by which signals are transmitted on the shared distributed arbitration bus being incompatible with the convention by which signals are exchanged on the particular sharing distributed arbitration bus.

10. The bus switch of claim 9 wherein each bus interface means is a separate assembly and said control circuit means is also a separate assembly.

11. The bus switch of claim 5 wherein each bus interface means is a separate assembly and said control circuit means is also a separate assembly.

12. The bus switch of claim 5 wherein each of said interface means are respectively adapted for exchanging signals with devices in accordance with a particular signaling convention, said interface means providing an indication if a device employing a different signaling convention, incompatible with the signaling convention to which said interface means is adapted, is connected to said bus connected to said interface means.

13. The bus switch of claim 5 wherein said digital data buses include a reset signal line in response to the assertion of the signal applied thereto all devices connected to said bus are reset, said bus switch further comprising means for asserting the signal applied by said bus switch to said reset signal line of said shared bus when a sharing bus interface card is initially selected to become enabled for exchanging information.

14. A method for operating a repeater for exchanging information between digital computing devices respectively connected to a first or a second distributed arbitration digital data bus, said distributed arbitration digital data

buses being interconnected by said repeater into a single composite digital data bus to which composite bus said digital computing devices connect in parallel, each of said digital data buses employing an identical protocol for exchanging information between pairs of digital computing devices connected thereto, which protocol includes a bus free phase during which none of the devices connected to said bus exchanges signals with any other device connected thereto, said protocol further including an arbitration phase that follows said bus free phase during which a digital computing device connected to said composite bus arbitrates to win control thereof to participate in a subsequent information exchange phase of said protocol, said protocol further including a selection phase that follows said arbitration phase during which a digital computing device that wins control of said composite bus selects another digital computing device with which information will be exchanged during said subsequent information exchange phase of said protocol, said digital data bus including a busy signal that is asserted by a digital computing device to indicate both the beginning of said arbitration phase of said protocol and that the device asserting said busy signal is participating in the arbitration phase and is attempting to win control of said composite bus, said digital data bus also including a plurality of device identification signals that devices, which assert the busy signal which they respectively apply to said first or second bus, selectively assert during said arbitration phase to indicate each device's priority for control of said composite digital data bus in relation to other devices connected to said composite data bus, furthermore, during said selection phase of said protocol said device identification signals being selectively asserted by said device that wins control of said composite digital data bus to identify that digital computing device connected to said composite bus with which said controlling device will exchange information, said digital data bus further including a selection signal that is asserted during said selection phase by the digital computing device that controls said

composite bus to indicate that such controlling device is selecting another device connected to said composite bus with which said controlling device will exchange information, during said selection phase said selected device transmitting a signal through said repeater to said winning device acknowledging that it has been selected for information exchange, said repeater receiving signals from and selectively applying signals to both of said digital data buses, said method for operating said repeater comprising the steps of:

while both said first and said second digital data buses remain in their bus free phases, remaining in a quiescent state in which said repeater asserts none of the signals that it applies to either bus;

if any device connected to said first or second bus commences said arbitration phase of said protocol by asserting the busy signal of that bus, responding to such assertion of said busy signal by asserting the busy signal of the other bus;

during said arbitration phase of said protocol, responding to assertion of a device identification signal on said first or second bus by asserting that signal on the other bus;

upon assertion of said selection signal by said winning device, storing information identifying to which of said first or second buses said winning device connects;

during said selection phase of said protocol, responding to assertion of said selection signal of said first or second bus by said controlling device by asserting the selection signal of the other bus;

during said selection phase of said protocol, responding to said controlling device's assertion of a device identification signal on said first or second bus by asserting that identification signal on the other bus; and

upon said selected device acknowledging that it has been selected for information exchange, storing

information identifying to which of said first or second buses said selected device connects.

15. The method of claim 14 wherein upon the commencement of said arbitration phase of said protocol by the assertion of the busy signal of either bus, responding to such assertion of said busy signal by also asserting the busy signal of the bus on which it was initially asserted.

16. The method of claim 14 wherein during said selection phase of said protocol said controlling device negates the busy signal which it first asserted on said bus during said arbitration phase, and said selected device transmits said signal acknowledging its selection for information exchange by asserting the busy signal on the bus to which the selected device connects, said repeater responding to assertion of the busy signal by said selected device by asserting the busy signal on the other bus.

17. The method of claim 16 wherein upon the assertion of said busy signal by said selected device during said selection phase of said protocol, responding to such assertion of said busy signal by also asserting the busy signal on the bus on which it was initially asserted.

18. The method of claim 14 wherein each of said digital data buses respectively includes a plurality of control signals some of which are transferred in one direction during said selection phase according to the bus protocol and others of which are transferred in an opposite direction during said selection phase, said method for operating said repeater comprising the step of:

during said selection phase of the bus protocol, transferring all control signals from the bus, to which said winning device is connected, to the other bus.

19. The method of claim 15 wherein said controlling device, during said arbitration phase and after winning control of said composite digital data bus and prior to commencement of said selection phase, asserts the selection signal, said method for operating said repeater further comprising the steps during the arbitration phase of:

responsive to assertion of a busy signal of either of the buses at the commencement of said arbitration phase of said protocol, latching the busy signals on both buses; and

responsive to assertion of the selection signal by said controlling device after winning control of the composite digital data bus, unlatching the busy signals on both buses.

20. The method of claim 19 wherein if the busy signals that said repeater applies to both data buses are not unlatched in response to assertion of the selection signal by said controlling device within a pre-established time interval, then the busy signals that said repeater asserts on both buses are unlatched at the expiration of said pre-established time interval.

21. The method of claim 17 wherein said controlling device, during said arbitration phase and after winning control of said composite digital data bus and prior to commencement of said selection phase, asserts the selection signal, said method for operating said repeater further comprising the steps during the arbitration phase of:

responsive to assertion of a busy signal of either of the buses at the commencement of said arbitration phase of said protocol, latching the busy signals on both buses; and

responsive to assertion of the selection signal by said controlling device after winning control of the composite digital data bus, unlatching the busy signals on both buses.

22. The method of claim 21 wherein if the busy signals that said repeater applies to both data buses are not unlatched in response to assertion of the selection signal by said controlling device within a pre-established time interval, then the busy signals that said repeater asserts on both buses are unlatched at the expiration of said pre-established time interval.

23. The method of claim 21 wherein during said selection phase either said controlling device or a device being selected asserts said busy signal, said method for operating said repeater further comprising the steps during the selection phase of:

responsive to assertion of said busy signal of either of the buses during said selection phase of said protocol, latching the busy signals on both buses; and

responsive to negation of the selection signal by said controlling device, unlatching the busy signals.

24. The method of claim 16 wherein said repeater connects to additional distributed arbitration digital data buses, each of said distributed arbitration digital data buses employing said identical protocol for exchanging data between pairs of digital computing devices connected thereto, said repeater including bus selection means for selecting from among said plurality of said data buses a pair thereof between which digital computing devices connected thereto will exchange information, said method for operating said repeater further comprising the steps of:

prior to interconnecting said pair of data buses into said composite digital data bus while said bus free phase of said protocol does not exist on one of said data buses, isolating said data buses from each other; and

when both of said buses are simultaneously in said bus free phase of said protocol, interconnecting said pair of said data buses into said composite digital data bus.

25. The method of claim 24 wherein said digital data buses also include a reset signal in response to the assertion of which all devices connected to said bus are reset, said method for operating said repeater further comprising the step of:

when both of said buses are simultaneously in said bus free phase of said protocol and prior to interconnecting said pair of said data buses into said composite digital data bus, asserting the reset signal of one of said buses being interconnected into said composite bus.

26. The method of claim 14 wherein said repeater connects to additional distributed arbitration digital data buses, each of said distributed arbitration digital data buses employing said identical protocol for exchanging data between pairs of digital computing devices connected thereto, said repeater including bus selection means for selecting from among said plurality of said data buses a pair thereof between which digital computing devices connected thereto will exchange information, said method for operating said repeater further comprising the steps of:

prior to interconnecting said pair of data buses into said composite digital data bus while said bus free phase of said protocol does not exist on one of said data buses, isolating said data buses from each other; and

when both of said buses are simultaneously in said bus free phase of said protocol, interconnecting said pair of said data buses into said composite digital data bus.

27. The method of claim 26 wherein said digital data buses also include a reset signal in response to the assertion of which all devices connected to said bus are reset, said method for operating said repeater further comprising the step of:

when both of said buses are simultaneously in said bus free phase of said protocol and prior to interconnecting said pair of said data buses into said composite digital data bus, asserting the reset signal of one of said buses being interconnected into said composite bus.

AMENDED CLAIMS

[received by the International Bureau on 10 July 1991 (10.07.91); original claims 1-6,9,12-23 amended; new claims 28-32 added; other claims unchanged (12 pages)]

1. A repeater for exchanging information between digital computing devices respectively connected in parallel to a shared or to a sharing distributed arbitration digital data bus, said repeater interconnecting the shared and the sharing data buses into a single composite digital data bus, said repeater comprising:

shared bus interface means, connected to the shared distributed arbitration bus, for receiving signals from and transmitting signals to a device connected to the shared distributed arbitration bus;

sharing bus interface means, connected to the sharing distributed arbitration bus, for receiving signals from and transmitting signals to a device connected to the sharing distributed arbitration bus; and

control circuit means, simultaneously connected both to said shared bus interface means and to said sharing bus interface means, said control circuit means responding to a plurality of signals on the buses for controlling said bus interface means during the exchange of information between devices connected to the composite bus.

2. The repeater of claim 1 wherein information is exchanged between devices connected to the composite digital data bus in accordance with a protocol having a plurality of phases, said control circuit means controlling the exchange of information between the devices being also responsive to the occurrence of a sequence of phases of the bus protocol.

3. The repeater of claim 2 wherein the shared distributed arbitration digital data bus employs one convention for communicating signals thereon and the sharing distributed arbitration digital data bus employs a different convention for communicating signals thereon, the conventions by which signals are transmitted on the two distributed arbitration buses being incompatible with each other.

4. The repeater of claim 2 wherein each of said interface means are respectively adapted for exchanging signals with a device in accordance with a particular signaling convention, said interface means providing an indication if a device employing a different signaling convention, incompatible with the signaling convention for which said interface means is adapted, is connected to the bus connected to said interface means.

5. A bus switch for exchanging information between digital computing devices respectively connected in parallel to a shared or to one of a plurality of sharing distributed arbitration digital data buses, said bus switch interconnecting the shared and a selected one of the sharing data buses into a single composite digital data bus, the information being exchanged between devices connected to the composite digital data bus in accordance with a protocol having a plurality of phases, said bus switch comprising:

shared bus interface means, connected to the shared distributed arbitration bus, for receiving signals from and transmitting signals to a device connected to the shared distributed arbitration bus;

a plurality of sharing bus interface means, each of said sharing bus interface means being respectively connected to one of the sharing distributed arbitration buses, for receiving signals from and transmitting signals to a device connected to the sharing distributed arbitration bus to which said sharing bus interface means connects;

selection switch means for choosing which one of said sharing bus interface means is enabled for exchanging information between devices respectively connected to the shared bus and the selected sharing bus; and

control circuit means, simultaneously connected both to said shared bus interface means and to said sharing bus interface means, said control circuit means responding to a plurality of signals on the buses and to the occurrence of a sequence of phases of the bus protocol for controlling said

bus interface means during the exchange of information between devices connected to the composite bus.

6. The bus switch of claim 5 wherein said selection switch means comprises a plurality of selection switches, each such selection switch being associated with one of said sharing bus interface means and with the sharing distributed arbitration bus connected thereto, activation of each such selection switch generating a selection signal that presents a request for exchanging information between devices respectively connected to the shared distributed arbitration bus and the sharing distributed arbitration bus with which said selection switch is associated.

7. The bus switch of claim 6 wherein each of said selection switches is electrically connected directly to said sharing bus interface means with which said selection switch is associated.

8. The bus switch of claim 6 wherein each of said selection switches is electrically connected directly to said sharing bus interface means with which said selection switch is associated by a bus which is separate from the sharing distributed arbitration bus with which said selection switch is associated.

9. The bus switch of claim 5 wherein one of the distributed arbitration digital data buses employs one convention for communicating signals thereon and another of the distributed arbitration digital data buses employs a different convention for communicating signals thereon, the conventions by which signals are transmitted on these two buses being incompatible with each other.

10. The bus switch of claim 9 wherein each bus interface means is a separate assembly and said control circuit means is also a separate assembly.

11. The bus switch of claim 5 wherein each bus interface means is a separate assembly and said control circuit means is also a separate assembly.

12. The bus switch of claim 5 wherein each of said interface means are respectively adapted for exchanging signals with a device in accordance with a particular signaling convention, said interface means providing an indication if a device employing a different signaling convention, incompatible with the signaling convention for which said interface means is adapted, is connected via the bus to said interface means.

13. The bus switch of claim 5 wherein the digital data buses include a reset signal line for transmitting a reset signal, said bus switch further comprising means for momentarily asserting the reset signal of the shared bus upon a sharing bus interface means becoming enabled for exchanging information.

14. A method for operating a repeater for exchanging information between digital computing devices respectively connected to a first or a second distributed arbitration digital data bus; said distributed arbitration digital data buses being interconnected by said repeater into a single composite digital data bus to which composite bus the digital computing devices connect in parallel; each of said digital data buses employing an identical protocol for exchanging information between pairs of digital computing devices connected thereto, which protocol includes a bus free phase during which none of the devices connected to said bus exchanges signals with any other device connected thereto; said protocol further including an arbitration phase that follows said bus free phase during which a digital computing device connected to said composite bus arbitrates to win control thereof to participate in a subsequent information exchange phase of said protocol; said protocol further including a selection phase that follows said arbitration

phase during which a digital computing device that wins control of said composite bus selects another digital computing device with which information will be exchanged during said subsequent information exchange phase of said protocol; said digital data bus including a busy signal that is asserted by a digital computing device to indicate both the beginning of said arbitration phase of said protocol and that the device asserting the busy signal is participating in said arbitration phase and is attempting to win control of said composite bus; said digital data bus also including a plurality of device identification signals that devices, which assert the busy signal that they respectively apply to said first or second bus, selectively assert during said arbitration phase to indicate each device's priority for control of said composite digital data bus in relation to other devices connected to said composite data bus; furthermore, during said selection phase of said protocol the device identification signals being selectively asserted by the device that wins control of said composite digital data bus to identify that digital computing device connected to said composite bus with which the controlling device will exchange information; said digital data bus further including a selection signal that is asserted during said selection phase by the digital computing device that controls said composite bus to indicate that such controlling device is selecting another device connected to said composite bus with which the controlling device will exchange information, during said selection phase the selected device transmitting a signal through said repeater to the winning device acknowledging that it has been selected for information exchange; said repeater receiving signals from and selectively applying signals to both of said digital data buses; said method for operating said repeater comprising the steps of:

while both said first and said second digital data buses remain in their bus free phases, remaining in a quiescent state in which said repeater asserts none of the signals that it can apply to either bus;

if any device connected to said first or second bus commences said arbitration phase of said protocol by asserting the busy signal of that bus, responding to such assertion of the busy signal by asserting the busy signal of said other bus;

during said arbitration phase of said protocol, responding to assertion of a device identification signal on said first or second bus by asserting that signal on said other bus;

upon assertion of the selection signal by the winning device, storing information identifying to which of said first or second buses the winning device connects;

during said selection phase of said protocol, responding to assertion of the selection signal of said bus to which the controlling device connects by asserting the selection signal of said other bus;

during said selection phase of said protocol, responding to the controlling device's assertion of a device identification signal on said first or second bus by asserting that identification signal on said other bus; and

upon the selected device acknowledging that it has been selected for information exchange, storing information identifying to which of said first or second buses the selected device connects.

15. The method of claim 14 wherein upon the commencement of said arbitration phase of said protocol by the assertion of the busy signal of either bus, said repeater responding to assertion of the busy signal by also asserting the busy signal of said bus on which it was initially asserted.

16. The method of claim 14 wherein during said selection phase of said protocol the controlling device negates the busy signal which it first asserted on said bus during said arbitration phase, and the selected device

transmits the signal acknowledging its selection for information exchange by asserting the busy signal on said bus to which the selected device connects, said repeater responding to assertion of the busy signal by the selected device by asserting the busy signal on said other bus.

17. The method of claim 16 wherein upon the assertion of the busy signal by the selected device during said selection phase of said protocol, said repeater responding to assertion of the busy signal by also asserting the busy signal on said bus on which it was initially asserted.

18. The method of claim 14 wherein each of said digital data buses respectively includes a plurality of control signals some of which are transferred in one direction during said selection phase according to said bus protocol and others of which are transferred in an opposite direction during said selection phase, said method for operating said repeater comprising the step of:

during said selection phase of said bus protocol, transferring all control signals from said bus to which the winning device is connected, to said other bus.

19. The method of claim 15 wherein the controlling device asserts the selection signal during said arbitration phase and after winning control of said composite digital data bus and prior to commencement of said selection phase, said method for operating said repeater further comprising the steps during said arbitration phase of:

responsive to assertion of the busy signal of either of said buses at the commencement of said arbitration phase of said protocol, latching the busy signals on both buses; and

responsive to assertion of the selection signal by the controlling device after winning control of said composite digital data bus, unlatching the busy signals on both buses.

20. The method of claim 19 wherein if the busy signals that said repeater applies to both data buses are not unlatched in response to assertion of the selection signal by the controlling device within a pre-established time interval, said method for operating said repeater further comprising the step of:

unlatching the busy signals that said repeater asserts on both buses at the expiration of the pre-established time interval.

21. The method of claim 17 wherein the controlling device asserts the selection signal during said arbitration phase and after winning control of said composite digital data bus and prior to commencement of said selection phase, said method for operating said repeater further comprising the steps during said arbitration phase of:

responsive to assertion of the busy signal of either of said buses at the commencement of said arbitration phase of said protocol, latching the busy signals on both buses; and

responsive to assertion of the selection signal by the controlling device after winning control of said composite digital data bus, unlatching the busy signals on both buses.

22. The method of claim 21 wherein if the busy signals that said repeater applies to both data buses are not unlatched in response to assertion of the selection signal by the controlling device within a pre-established time interval, said method for operating said repeater further comprising the step of:

unlatching the busy signals that said repeater asserts on both buses at the expiration of the pre-established time interval.

23. The method of claim 21 wherein during said selection phase either the controlling device or the device being selected asserts the busy signal, said method for operating said repeater further comprising the steps during said selection phase of:

responsive to assertion of the busy signal of either of said buses during said selection phase of said protocol, latching the busy signals on both buses; and

responsive to negation of the selection signal by the controlling device, unlatching the busy signals.

24. The method of claim 16 wherein said repeater connects to additional distributed arbitration digital data buses, each of said distributed arbitration digital data buses employing said identical protocol for exchanging data between pairs of digital computing devices connected thereto, said repeater including bus selection means for selecting from among said plurality of said data buses a pair thereof between which digital computing devices connected thereto will exchange information, said method for operating said repeater further comprising the steps of:

prior to interconnecting said pair of data buses into said composite digital data bus while said bus free phase of said protocol does not exist on one of said data buses, isolating said data buses from each other; and

when both of said buses are simultaneously in said bus free phase of said protocol, interconnecting said pair of said data buses into said composite digital data bus.

25. The method of claim 24 wherein said digital data buses also include a reset signal in response to the assertion of which all devices connected to said bus are reset, said method for operating said repeater further comprising the step of:

when both of said buses are simultaneously in said bus free phase of said protocol and prior to

interconnecting said pair of said data buses into said composite digital data bus, asserting the reset signal of one of said buses being interconnected into said composite bus.

26. The method of claim 14 wherein said repeater connects to additional distributed arbitration digital data buses, each of said distributed arbitration digital data buses employing said identical protocol for exchanging data between pairs of digital computing devices connected thereto, said repeater including bus selection means for selecting from among said plurality of said data buses a pair thereof between which digital computing devices connected thereto will exchange information, said method for operating said repeater further comprising the steps of:

prior to interconnecting said pair of data buses into said composite digital data bus while said bus free phase of said protocol does not exist on one of said data buses, isolating said data buses from each other; and

when both of said buses are simultaneously in said bus free phase of said protocol, interconnecting said pair of said data buses into said composite digital data bus.

27. The method of claim 26 wherein said digital data buses also include a reset signal in response to the assertion of which all devices connected to said bus are reset, said method for operating said repeater further comprising the step of:

when both of said buses are simultaneously in said bus free phase of said protocol and prior to interconnecting said pair of said data buses into said composite digital data bus, asserting the reset signal of one of said buses being interconnected into said composite bus.

28. A bus interface card adapted for use in a repeater for exchanging information between digital computing devices respectively connected in parallel to a shared or to a sharing distributed arbitration digital data bus, said repeater interconnecting the shared and the sharing data bus into a single composite digital data bus, said repeater including control circuit means adapted for connection respectively to bus interface cards for the shared and the sharing distributed arbitration digital data buses, said control circuit means responding to a plurality of signals on the buses for controlling the bus interface cards during the exchange of information between devices connected to the composite bus, said bus interface card comprising:

means for connecting to the distributed arbitration bus;

means for connecting to said control circuit means; and

means for exchanging signals between a device connected to the distributed arbitration bus and said control circuit means.

29. The bus interface card of claim 28 wherein information is exchanged between devices connected to the composite digital data bus in accordance with a protocol having a plurality of phases, said bus interface card being adapted for control by said control circuit means in response to the occurrence of a sequence of phases of the bus protocol.

30. The bus interface card of claim 29 wherein the shared distributed arbitration digital data bus employs one convention for communicating signals thereon and the sharing distributed arbitration digital data bus employs a different convention for communicating signals thereon, the conventions by which signals are transmitted on the two buses being incompatible with each other.

31. The bus interface card of claim 29 wherein each of said interface cards are respectively adapted for exchanging signals with a device in accordance with a particular signaling convention, said interface card providing an

indication if a device employing a different signaling convention, incompatible with the signaling convention for which said interface card is adapted, is connected via the bus to said interface card.

32. The bus interface card of claim 29 further comprising selection switch means for enabling said bus interface card for exchanging information between said control circuit means and a device connected to the distributed arbitration data bus to which said interface card connects.